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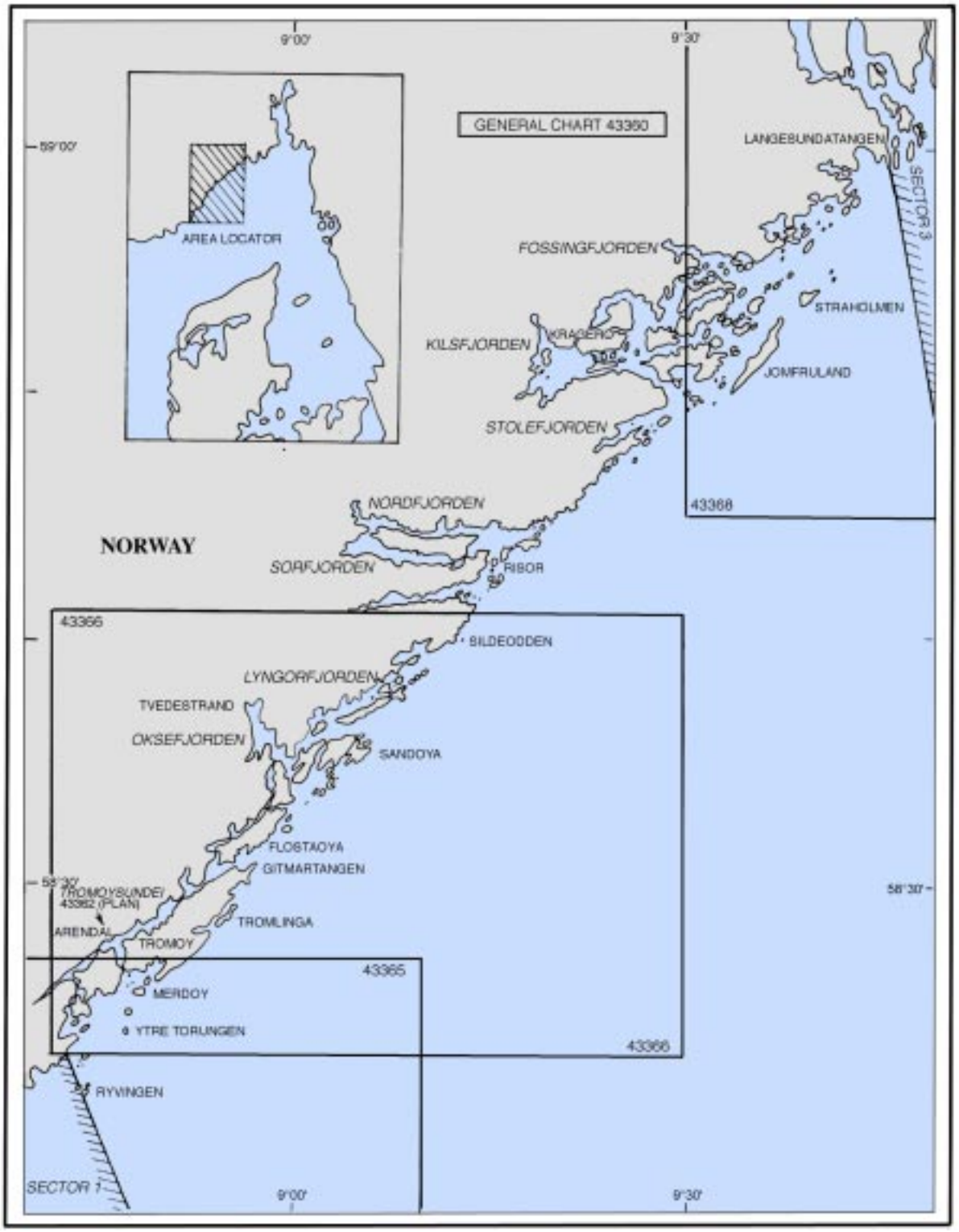

Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **2** — CHART INFORMATION

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SECTOR 2

NORWAY—SOUTHEAST COAST—ARENDAL TO LANGESUNDSFJORDEN

Plan.—This sector describes the SE coast of Norway for a straight line distance of about 49 miles between a position close NE of Ryvingen, a small island in the SW approaches to Arendal, and Langesundstangen, the W entrance point to Langesundsfjorden. The description is SW to NE.

General Remarks

2.1 The SE coast of Norway between Arendal and Langesundsfjorden is primarily a monotonous succession of level land and unremarkable, rounded hills. The coastline is less irregular than that from Arendal SW to Lindesnes and off-lying islands and dangers tend to lie closer inshore and to decrease in number the farther NE.

Natural landmarks and distinguishing features are scanty and widely separated. Those more readily available to vessels standing off the coast are: the three mountain peaks of Tromlingene; the irregular ridge Hovdefjell, NNW of Arendal; and the low-lying, elongated island Jomfruland, E of Kragero in the NE part of the coast.

An extensive aerial target firing area lies off much of the coast and extends well seaward from the approaches to Langesundsfjorden. Coast artillery firing areas are located in the immediate approaches to Langesundsfjorden and extend several miles into the far NE part of the coast described in this sector.

Areas within the Sorlandet Maritime Defense District are prohibited to navigation; details of the limits should be obtained locally.

Arendal to Risor

2.2 The coastline between Arendal and Sildeodden, a mainland point about 18 miles NE, is indented by a series of small inlets. Oksefjorden, the largest of these inlets, forms the most considerable and central of all the indentations within the area. Inland the terrain in the SW part is mostly flat, becoming progressively higher and more forested to the NE of Arendal.

The coastline is sheltered by an uninterrupted grouping of off-lying islets, islands, and rocks, which become difficult to distinguish from the mainland background by reason of their generally gray color and low-lying character.

Tromlingene (58˚38'N., 8˚38'E.), about 12 miles NNW of Arendal, consists of three mountain peaks which are quite conspicuous. Hovdefjell, about 4 miles NNE, is a rather irregular ridge somewhat less conspicuous than Tromlingene.

In clear weather, both Tromlingene and Hovdefjell have been seen at a distance of about 50 miles.

The outer dangers along this part of the coast are steep-to, a good distance should be maintained in thick weather.

There is often poor visibility during onshore winds when a strong set toward land occurs in the vicinity of Tromoy, the largest island which lies close off Arendal.

The main approach to Arendal is made from a position SE of **Torungen Light** (58˚23.8'N., 8˚47.9'E.) and entering the channel through **Galtesundet** (58˚26.5'N., 8˚47.0'E.). The channel separates Hisoy on the W from Tromoy on the E side.

A secondary approach is made from a position ENE of the range lights of **Gitmertangen** (58˚30.7'N., 8˚57.0'E.) and entry through Tromoysundet. During adverse weather conditions, entry through Galtesundet is preferred.

Arendal (58˚28'N., 8˚46'E.)

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2.3 Arendal is an industrial and commercial town lying at the entrance to the river Nidelva. It lies landward of the large, rocky, and forested, off-lying islands Hisoy and Tromsoy.

The harbor area comprises all of Galtesund and extends SW as far as the head of Skarvedalsbukta and NE into Tromoysundet up to the suspension bridge at Broneset.

Ice.—Ice is seldom a hindrance, though in particularly cold winters it may form throughout the harbor in February and March. The port is kept open by an icebreaker during this period.

Tides—Currents.—The tidal currents and water level fluctuation are negligible; the tidal range is approximately 0.3m.

The outflow from the river Nidelva establishes a constant E set through the harbor and, in general, a S set through Galtesund at a rate which varies. The greatest outflow occurs with the melting snows of spring or with the runoff subsequent to heavy rainfall and may reach a maximum rate of 4 knots which rapidly decreases to relative insignificance NE of Hisoy.

Depths—Limitations.—The least depth in the entrance to the port is 22m. At Arendal, there are 27 berths, 30 to 230m long, with depths of 4.5 to 11m alongside. Vessels up to 50,000 dwt and 10.06m draft can be accommodated.

There is a smelting facility at Eydehavn (58˚29.8'N., 8˚52.4'E.), on the NW shore of Tromoysudet, fronted by four berths. The largest is 176m long and has depths of 5.2 to 9.5m alongside.

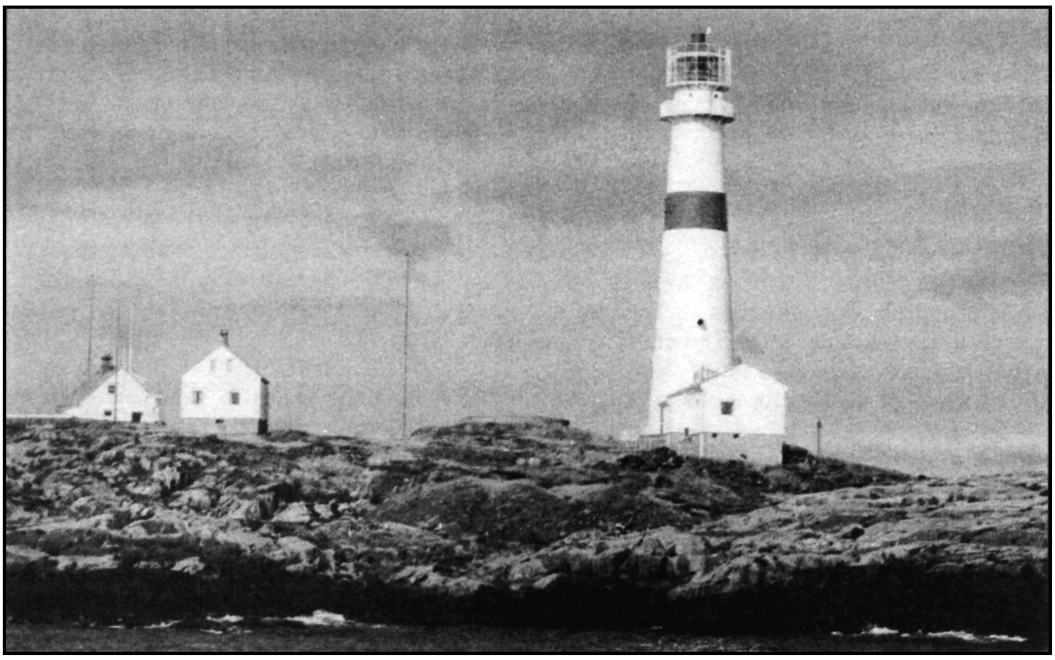
The suspension bridge spanning Tromoysundet at Broneset (58˚28'N., 8˚49'E.) has a vertical clearance of 37m over a width of 100m.

Aspect.—Tromoy Church (58˚27'N., 8˚52'E.), standing on the seaward side of Tromoy, is a conspicuous cruciform structure having white walls and a high dark roof. It has no tower but is very prominent from E.

Veden, a rounded hillock, is 52m high. It is prominent and rises in the SW part of Tromoy.

The old disused lighthouse (58˚24.8'N., 8˚47.6'E.), standing in the center of Indre Torungen, is 29m high and conspicuous.

Lille Torungen Light (58˚24.7'N., 8˚47.7'E.) is shown from a structure standing in the SE part of the islet, about 0.1 mile SE of the old lighthouse.



TORUNGEN LIGHTHOUSE FROM S

LILLE TORUNGEN (DISUSED LIGHTHOUSE) FROM SW

Torungen Light (58˚23.9'N., 8˚47.6'E.) is shown from a prominent metal tower, 34m high, standing on Ytre Tourungen, 0.8 mile S of the old lighthouse.

Pilotage.—Pilotage is compulsory for vessels over 100 tons within the port. Vessels should send an ETA at least 24 hours in advance. The pilot can be contacted by VHF or telephone and boards about 1.5 miles ESE of Torungen Light. The station also provides pilots for Risor and Grimstad.

Regulations.—The speed limit within the harbor area is 6 knots for deep-sea vessels, 12 knots for pleasure craft, and 4 knots off the principal berthing facilities. This rule does not apply to sea planes when landing or taking off. When possible, plane landings are reported to the Harbormaster.

Anchorage.—The bay to the S of Revesaand (58˚26'N., 8˚48'E.) affords good anchorage for vessels up to 10,000 dwt. Vessels may anchor anywhere within the bay, but clear of the submarine cable and pipeline. The bottom consists of sand and clay with good holding ground.

Vessels may anchor within a bay off the E side of Buoya (58˚30'N., 8˚54'E.). The anchorage has good holding ground in a depth of 34m, clay, but limited swinging room.

Vessels can anchor anywhere in the harbor area, clear of the main channel, with good holding ground of clay and mud. Care is necessary to avoid the submarine cables and pipeline extending S from Tyholmen. The main anchorage berths are in depths of 23 to 25m NE of Pussnespynten (58˚28'N., 8˚47'E.)and in a depth of 22m WNW of Nordodden (58˚27'N., 8˚46'E.).

Vessels subject to quarantine should anchor in depths of 15 to 27m, mud, N of Store Skotholmen (58˚27'N., 8˚47'E.), an islet lying along the E side of Galtesund.

Caution.—A number of ferry routes cross the harbor and its approaches.

Tromoysundet is used by seaplanes for landing and take-off.

2.4 Tromoy (58˚28'N., 8˚58'E.) is a large, low-lying island, extending NE along the mainland from Arendal for a distance of about 8 miles. A series of inlets indents its SE side and it is fronted by numerous awash and submerged dangers.

The dangers along the SE side of Tromoy lie shoreward of a line having Indre Torungen's former lighthouse in range 241.5˚ with the mainland hill **Lauvasen** (58˚23'N., 8˚40'E.).

With an onshore wind, currents tend to set strongly to landward in the vicinity of Tromoy. Fog or heavy rain often occur subsequent to these conditions, inshore navigation is not recommended during the periods of low visibility.

Alvekilen (58˚28'N., 8˚54'E.), a narrow, rock encumbered inlet on the SE side of Tromoy, affords anchorage to vessels with a draft no greater than 4m, in a depth of 7m, mud and sand. The approach to the anchorage is from the SSE, passing close E of **Tallagen** (58˚27'N., 8˚54'E.), a rock with a depth of 1.8m, and proceeding to pass E of Batstangen, the low-lying, light colored S entrance point of Alvekilen.

Local knowledge is required.

Tromlingsundet (Skarekilen) (58˚29'N., 8˚55'E.) is entered about 2 miles NE of Tallagen.

It affords a different anchorage to small vessels in 12 to 15m soft bottom. Vessels approach from the NE and steer so as to pass NW of the usually visible awash rock, **Klovebaen** (58˚29'N., 8˚55'E.), situated about 0.2 mile NNE of the island Tromlingen.

2.5 Tromsoysundet (58˚29'N., 8˚51'E.), formed between Tromoy and the mainland, although 183m wide in places is primarily unencumbered, and extends NE about 6 miles from Arendal. The NE approaches are encumbered by an extensive area of awash and submerged dangers.

A suspension bridge with a vertical clearance of 37m, over a mid-channel width of 100m, crosses Tromsoysundet about 2 miles NE of Arendal.

Trollenes on the NW shore of Tromsoysundet 1 mile SSW of Saltrod, has two bunkering stations each with a concrete quay 11m in length and a depth of 6m alongside.

Three overhead cables, each with a vertical clearance of 12m, cross Dypvika 0.15 mile N of Trollenes.

Tromsoysundet NE entrance may be approached from the S or ENE.

Vessels bound for the NE entrance from the S, steer so as to pass E of **Brenningane** (58˚28'N., 8˚56'E.), W of the 14m, submerged rock about 0.5 mile NNE, then W of the submerged rock, Dybingsbaen, 0.45 mile farther NNE.

When the vessel is clear of Dybingsbaen, steer to pass E of the submerged dangers off-lying Gitmerstangen, and W of the submerged danger Vestre Fladen, lying 0.75 mile NNE of Dybingshaen and Svartskjaergrunnen 0.5 mile farther N. Then steer between Ostre Svartskjaer to starboard, and Vestre Svartskjaer to port, thereafter follow the ENE approach track.

Bonden (58˚31'N., 8˚59'E.), a rounded, and barren awash rock, marked by a low-lying cairn and light, is situated on the S side of Bondedybet. Bondedybet lies about 2 miles ENE of Gitmertangen.

Approaches to Tvedestrand.—The approaches to Tvedestrand lead from the SSW, SE, and E through off-lying dangers to the seaward entrance to Oksefjorden, then in mid-channel through the inlet to destination.

The offshore approaches to **Oksefjorden** (58˚35'N., 9˚00'E.) are obstructed by a scattered multitude of awash and submerged dangers which extend from Tromoy to the island Sandoya and beyond, 5 miles NE. The major portion of submerged dangers rise steep-to from surrounding deeps and lie unmarked except for the breakers that occur over them.

Ostre Sandskjaer (58˚34'N., 9˚02'E.), marked by a cairn, is situated in the E approach to Oksefjorden. Fugloy, an islet marked by two cairns, lies in the approach about 0.7 mile NNE of Ostre Sandskjaer. Bjorka, a good mark in this approach, stands 1.5 miles NNW of Ostre Sandskjaer.

2.6 Tvedestrand (58˚37'N., 8˚56'E.) is a small community lying at the head of Oksefjorden.

Ice.—Ice is frequent and in severe winters can close the inlet from March to April. Icebreakers are available during these periods to keep the channel open between Boroya and Tvedestrand.

Tides—Currents.—Little current or tidal rise occurs in Tvedestrand. Tidal currents occur in Oksefjorden and usually set S except in the winter with E gales and in the summer when they set N in the morning and S in the afternoon.

Depths—Limitations.—There are two wharves with a length of 42m and 72m respectively. The depth alongside of these wharves is 7m. There is also a third wharf with a depth of 3.3m alongside. The general depths in the approach to Tvedestrand through Oksefjorden will accommodate medium draft vessels with a maximum draft of 5.9m.

Pilotage.—Pilotage is compulsory; however, arrangements for services must be made through either Arendal or Risor.

Anchorage.—Stamnesbukta (58˚37'N., 8˚57'E.), in the E arm at the head of Oksefjorden, has a quarantine anchorage in 20m, good holding ground.

Tvedestrand harbor has good anchorage for small vessels in 14m, good holding ground. Anchorages are available in Oksefjorden according to draft.

Skeggesto (58˚35'N., 9˚00'E.), on the W side of the entrance to Oksefjorden, fronts on a water area which has anchorage for small vessels in 19m, good holding ground in a position clear of the fairway.

Utgardsstranda, on the E side of Oksefjorden opposite Skeggesto, fronts on a cove which has good anchorage for small vessels in 30m, good holding ground.

Dyngoyholmen, an islet on the E side of Oksefjorden, has anchorage close SW with Siapynt in range 180˚ with the NW extremity of Store Havneholmen, in a depth of 20m. Vessels approaching from the S pass W of Siaben, an awash rock lying off Siapynt.

Gravika, a mainland bight about 0.5 mile N of Dyngoyholmen, has anchorage in 17m in a position NW of the islet Bukkholmen.

Vessels enter from the W steering between the steep-to mainland and a submerged rock, 4m, about 50m offshore.

An overhead cable, with a vertical clearance of 16m, spans the channel at the anchorage.

2.7 From Tvedestrand to **Sildeodden** (58˚40'N., 9˚12'E.), about 9 miles NE, the coastline is characteristically irregular. It is fronted seaward by several larger islands and a number of smaller islands, which while generally lower than the mainland and tending to blend in with the background, are separated by openings that are distinguishable from sea. Many deep water passages lead through these dangers.

Torskbaen, the danger farthest to sea, is a narrow submerged reef, paralleling offshore islands for a distance of about 4 miles. In many places, it is marked by breakers during a heavy sea.

Persknatten (58˚39'N., 9˚13'E.), is a 19.8m patch lying about 1 mile SSE of Sildeodden. A beacon tower stands 0.8 mile NNW of Persknatten.

A sheltered inner passage leads NE from Oksefjorden to Sildeodden. It is narrow in places but generally is quite deep throughout.

Regulations.—Local regulations require that vessels transiting Havefjorden proceed at a speed no greater than 6 knots.

2.8 Anchorage.—Anchorage for small vessels with local knowledge are available throughout the inner passage between Tvedestrand and the S approach to Risor.

Havefjorden (58˚35'N., 9˚02'E.) has general anchorage in 18 to 53m, soft bottom, in a position throughout the fairway, save in the middle portion between Rekvika and Haven, where the bottom is rocky.

Aspevik, on the W side of Havefjorden, has anchorage in 34m, soft bottom. Vessels usually moor bow and stern.

Krakvag (58˚37'N., 9˚02'E.), an inlet N of Jesoy, has good anchorage in 21 to 26m, mud, in a position near the head of the inlet. Vessels make their approach NE of Jesoy and steer so as to pass between that island and the 1m submerged rock of Bjorkholmgrunnane, then, hauling to starboard, round the mainland point Bringebaernes, where they proceed so as to clear the 4m submerged rock lying in the middle of the inlet and continue on to the anchorage.

Halsen, a community close E of Krakvag, fronts on a small bay which has good anchorage in 21m, mud and clay, in a position with the E extremity of the islet Ostre Halsholmen in range about 134˚ with the multicolored beacon standing in the NE part of Sandoya. Vessels make their approach E of Bjorkholmgrunnane and steer so as to pass between Ostre Halsholmen and a 2m submerged rock off-lying awash dangers about 229m to the E, where as they proceed in mid-channel to the anchorage.

Dypvagkilen (58˚38'N., 9˚04'E.), a narrow, reef-fringed but deepwater inlet on the NW side of Lyngorfjorden, has good anchorage throughout and, in particular, in 15 to 20m, mud, in a position E of the community Dypvag.

Prestholmane islet group has anchorage in 32m, in a position about 0.2 mile to the SE. Ostre Loktene, an island E of Dypvagkilen, has anchorage in 27m within a steep-shelving bight on its NW side.

Ostre Askeroy (58˚37'N., 9˚06'E.), a small community on the NW side of Askeroya, fronts on a small cove which has anchorage in 14m, good holding ground of hard clay. Vessels make their approach E of the awash and submerged rocks at Paerene and close to the steep-to W side of the cove.

2.9 Vollen (58˚39'N., 9˚09'E.) a small community on the W side of the small island Risoy, fronts on a sheltered water area having good anchorage in 20 to 21m, hard sand and clay. A bridge, with a vertical clearance of 6m, spans the SW approach, between Risoy and the mainland.

Klaholmen (58˚36'N., 9˚05'E.), a village near the NE end of Sandoya, about 2 miles ENE of the beacon on Bjorka, is a harbor for small vessels with local knowledge; it is sheltered by islands and a chain of reefs lying off the SE side of the island. There is good anchorage in a depth of 15m, but the swinging room is restricted by many submerged rocks; there are mooring rings which should be used.

The best approach is from S through a narrow channel between two extensive reefs, then between Haholmane and Risholmen. The NE approach from close N of Klaholmane requires good local knowledge.

A beacon, standing close N of Klaholmen and a beacon on the N end of Klaholmane are good marks for approaching Klaholmen.

Sandoyfjorden (58˚36'N., 9˚05'E.) formed between the N side of Sandoya and the S part of Askeroya, is a deep winding channel which provides access for vessels from the open sea to the N entrance to Havefjorden; it should not be entered without local knowledge.

Vestre Askeroy (58˚36'N., 9˚03'E.), a small community at the SW extremity of Askeroya, fronts on a cove that has anchorage for small vessels in 17m good holding ground, in a position with the N extremity of the sheltering islet Lamholmen in range with the awash rocks of Langbaen.

Smaholmane (58˚36'N., 9˚03'E.), a group of awash rocks off-lying the NW part of Sandoya, has good anchorage for small vessels in a position between the S limit of the rocks and the N side of Sandoya in a depth of 18m, clay, good holding ground.

2.10 Lyngor (58˚38'N., 9˚08'E.) is a small community lying scattered along the shores of several rocky islands, Steinsoy, Holmen, Odden, and Lyngoy, which together with the NW side of Askeroya, enclose a deep, somewhat constricted harbor that offers good shelter for small vessels in all kinds of weather.

Lyngor is approached from sea by the means of four channels passing, respectively, through Fiskeskjaergapet, Rundholmgapet, Kjeholmgapet, and Ostregapet.

Fiskeskjaer (58˚37'N., 9˚08'E.), marked by a beacon, is situated 0.25 mile S of the island Lyngoy; it is a useful mark in transiting **Fiskeskjaergapet** (58˚37'N., 9˚08'E.).

Vessels in transit, steer for a white patch on the SE side of Steinsoy on a heading of 327˚, and open E of the NE extremity of Askeroya.

In heavy seas, the patch is held just behind Askeroya so that vessels may pass Torskebaen in deeper water. When inside Torskbaen, vessels should steer to pass W of the 7m rocky patch, lying about 0.3 mile SSE of Fiskeskjaer beacon.

Vessels then proceed in mid-channel to pass between Fiskeskjaer, and the many dangers situated 180m W, and then between Lyngoy and Askeroya and on into Lyngor harbor.

A submarine cable exists between the NE extremity of Lyngoy and the W extremity of Kjeholmen.

A sewer extends 0.35 mile NE into the channel from Lyngoy. Beacons in line mark its alignment.

2.11 Rundholmgapet (58˚37'N., 9˚09'E.) is available only to small vessels with local knowledge and then only during fair weather; the channel is narrow.

Vessels steer to pass E of the 7m rocky patch lying 0.35 mile SSE of Fiskeskjaer, and **Vestre Bosse** (58˚37'N., 9˚09'E.), situated 0.4 mile SE of Fiskeskjaer beacon.

Then steer E of Fiskeskjaer and then in the narrow passage between Lyngoy and Rundholmen, about 91m SW.

When clear of the narrows; continue in mid-channel as described above.

Kjeholmgapet, the most commonly used nighttime approach to Lyngor from sea, passes between Lyngoy and the small island **Kjehl** (58˚38'N., 9˚09'E.), 0.2 mile to the E.

Vessels with local knowledge intending to transit Kjeholmgapet, steer to pass E of the 11m below-water rock about 0.7 mile SSE of the light on Kjeholmen, then proceed to pass between the 8.8m below-water rock lying close off the islet Lyngor Stangholmen and the 11m below-water rock about 206m farther NE. A mid-channel course should be steered to pass between Kjeholmen and Humleholmen, an islet close off the NE extremity of Lyngoy, then steer to port and continue in mid-channel to Lyngor harbor.

Ostregapet (58˚39'N., 9˚11'E.), the farthest NE of several approaches to Lyngor, is the deep water passage between the rock fringed islet Gjevingstangholmen and **Lille Snerte** (58˚39'N., 9˚11'E.), about 0.4 mile NNE. These two islets are marked by beacons.

Lyngor Harbor has anchorage for small vessels in 19 to 25m, sand and clay, good holding ground. Care must be taken to stay clear of a submarine cable crossing the N entrance to the harbor between Steinsoy and Holmen, and clear of the submerged rocks lying close off the S extremity of Holmen.

Care is necessary to avoid a submarine cable lying between the NE side of Steinsoy and the NW extremity of Holmen.

Overhead cables, with a least vertical clearance of 25m, span the channel between the S part of Steinsoy and Askeroy.

Submarine cables also cross the channel. Anchoring is prohibited in their vicinity.

Good nighttime anchorage is available in the water area formed between Odden, Kjeholmen, and the awash rocks Terneskjaera, for small vessels, in depths of 21 to 40m.

There is a speed limit of 5 knots in the harbor and approaches.

2.12 Sandnesfjorden (58˚42'N., 9˚13'E.), entered close SSW of Risor, extends about 5 miles WSW from its entrance.

It is quite deep throughout except in the W part. The entrance is encumbered with islands and rocky patches.

Sandnesfjorden is entered from sea by way of passages leading N and S of the small hilly island **Store Furuoy** (58˚42'N., 9˚13'E.).

Hoibotangen (58˚41'N., 9˚14'E.) is the reef fringed S entrance point of Sandnesfjorden; Vetefjell, a hill, is situated about 0.6 mile of the point.

There are several submerged rocks in the vicinity of Hoibotangen; **Hoibaen** (58˚41'N., 9˚15'E.), has a charted depth of 7m, it lies 0.5 mile E of the point.

Fjordbaen, with a charted depth of 0.5m lies 0.5 mile N of the point. Other dangers in the area may be seen on the chart.

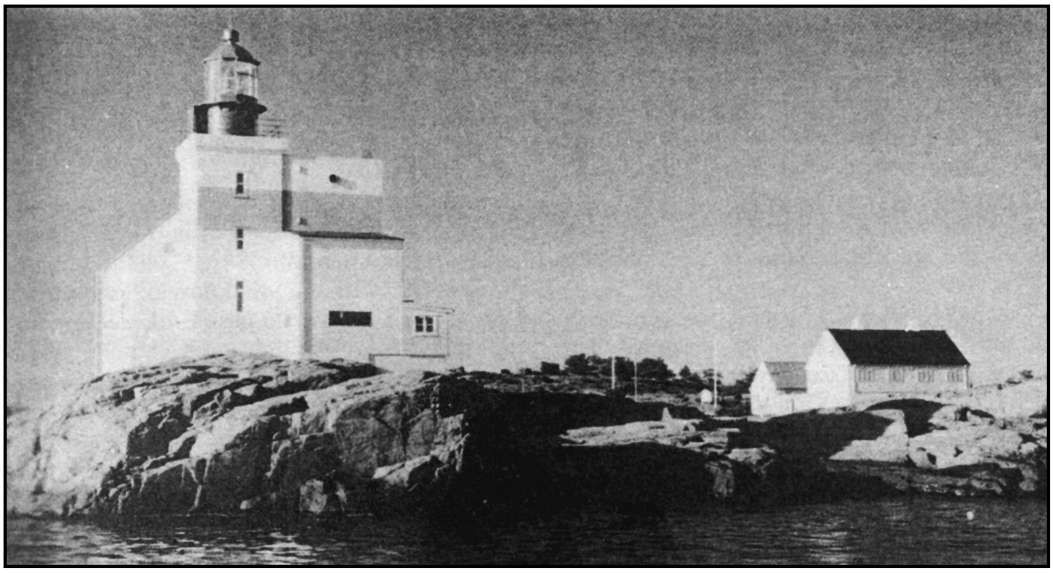
Anchorage.—In Sandnesfjorden, because of the considerable depths in the inlet, anchorage is limited to the area W of **Haholmen** (58˚41'N., 9˚09'E.), situated about 3 miles WSW of Store Furuoy.

There are depths of 10 to 30m, mud, good holding ground, in the several small coves which indent the sides of Sandnesfjorden.

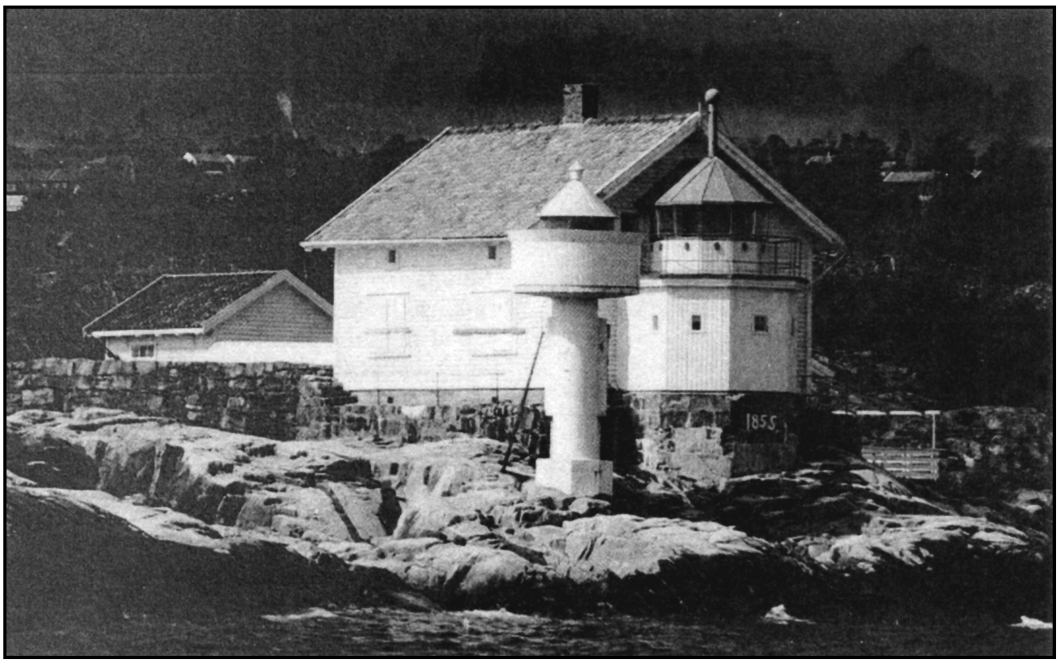
Lovik (58˚42'N., 9˚11'E.) a small community on the S side of the inlet, 0.6 mile WSW of Lille Furuoy, has anchorage for small vessels in a depth of 13 to 19m. Vessels may approach from the E through either passage N or S of Store Furuoy.

Asvika (58˚42'N., 9˚10'E.), a cove on the N side of the inlet, 0.6 mile W of Langholmen, has anchorage in 21m. Vessels steer to pass N of a 3.7m below-water rock lying directly in the entrance to the cove.

Amlandskilen (58˚42'N., 9˚09'E.), a cove close W of Asvika, has anchorage for small vessels with local knowledge, in 8 to 11m. Vessels enter the cove close W to clear the foul ground on the E side.



LYNGOR LIGHTHOUSE FROM S

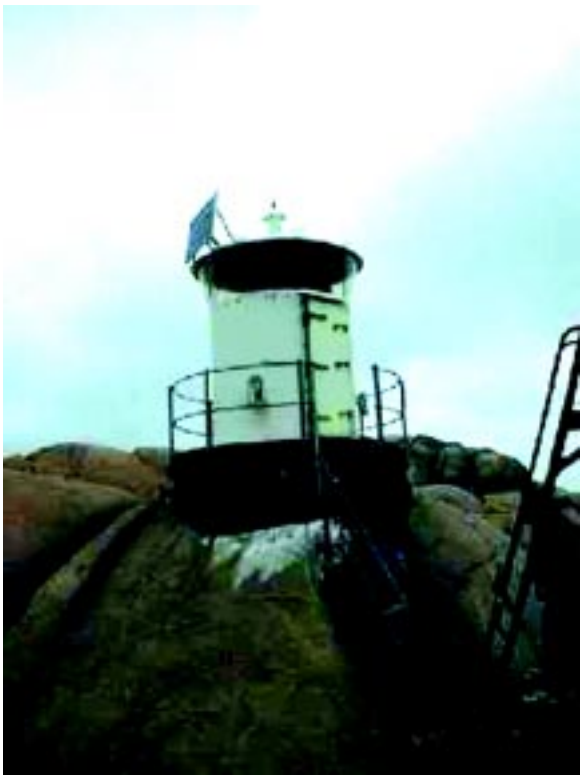


STANGHOLMEN LIGHTHOUSE FROM SE

Stangholmgapet (58˚42'N., 9˚15'E.), the most favored S approach to Risor, is a deep but very narrow passage formed between the small island, **Store Stangholmen** (58˚42'N., 9˚15'E.) and the foul ground to the E.

During storms from the S, the sea may break completely across the passage, at such times the vessels will detour by way of the passage S and W of Store Taraldskjaer.

2.13 Gronholmgapet, the commonly used E approach to Risor, is a narrow, winding passage between **Stangholmen** (58˚42'N., 9˚15'E.) and Gronholmen, about 0.1 mile N. The passage is difficult to make out from the distance, but its transit is considered relatively easy during fair weather. It should only be used by vessels with local knowledge.



STANGHOLMEN BEACON

Gronholmen (58˚45'N., 9˚20'E.) has anchorage for small vessels, with local knowledge in a deepwater pool fringed by foul ground about 0.2 mile NNW.

Vessels approach the anchorage from the S and steer close to Gronholmen to avoid a below-water 2m rock situated about 114m W; the anchorage is in 20m, clay.

Kjorvik (58˚45'N., 9˚18'E.), a small mainland community about 0.6 mile W of Gronholmen, fronts on a water area that has anchorage for small vessels in 15m clay and sand.

Vessels commonly approach from the SW and steer between the islets Sildholmen and Serkholmane. A submarine cable is laid between these two islets.

Risor (58˚43'N., 9˚14'E.)

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2.14 Risor is situated at the E end of a promontory which separates Sandnesfjorden from Sondeledfjorden. The town has small timber processing, stone, and plastic industries; exports consist mainly of wood pulp and timber.

Winds—Weather.—A swell occasionally sets in and during especially hard winters ice may form, but the latter is soon broken up with S winds.

Tides—Currents.—Tides and currents are negligible.

Depths—Limitations.—The harbor is near the open sea and is considered relatively easy to enter. There is a wharf with a length of 120m and a depth alongside of 9.1m. There is sufficient water for vessels with a draft of 8.5m and 10,000 dwt to enter.

Aspect.—Risor Flekk, close E of Risor, is a conspicuous white patch high up on the face of a rocky wall; it can be distinguished well out to sea. A hill rising about 0.3 mile of Risor Flekk is useful when approaching from the E.

Pilotage.—Pilotage to Risor is compulsory; pilots are provided at Arendal and Kragero.

Regulations.—There is a speed limit of 7 knots within Stangholmen, and of 4 knots in the inner harbor.

Anchorage.—Risor harbor has anchorage in 25 to 33m, sand and mud, good holding ground. The anchorage is SSE of the islet which lies close off the wharf. The anchorage is open to S storms.

2.15 **Sondeledfjorden** (58˚44'N., 9˚09'E.), entered close N of Risor, is divided into two parts by the island Barmen.

Nordfjorden, the N part is deep, and relatively unencumbered, with high forested land on both sides. Sorfjorden, the S part, is deep but encumbered with islets and numerous shoal patches. It is closed to shipping by a bridge at the E end between Barmen and the mainland.

Kranfjorden (58˚44'N., 9˚14'E.), formed between the SE side of Barmen and the mainland N of Risor, has sheltered anchorage in all weather for large vessels in 29m, about 0.2 mile SSW of the island of Finnoy, clear of the cables and pipeline. Vessels are subject to quarantine anchor here. The approach to the anchorage is made between the 0.5m below-water rock off the mainland and the 2.5m below-water rock S of Finnoy.

A submarine cable exists between the middle of Finnoy and the mainland, 0.25 mile SE. There is a submarine pipeline between the W end of the island and the S shore of the inlet at Krana. The narrow channel between Finnoy and the SE side of Barmen is foul. It is spanned by an overhead cable with a vertical clearance of 7m.

The wood pulp factories in Kranfjorden close NW of Risor have two concrete quays, the larger of which is 120m in length and has a depth of 10m alongside.

Kjodvik (58˚45'N., 9˚13'E.), on the N side of Nordfjorden, has anchorage for moderate size vessels in 27m.

Sivikkilen, an inlet close W of Kjodvik, has anchorage for large vessels in the outer part in 33m and in 23m in the inner part.

Sorfjorden has anchorage for large vessels off the village of Rod, at its W end, in depths up to 22m, mud. Vessels with local knowledge can anchor anywhere in the fjord clear of the many islets and shoals between Nautenes, a small peninsula on the S shore 1.5 miles E of Rod, and Hanoy 1.5 miles farther E.

2.16 Between Risor and **Langesundstagen** (58˚59'N., 9˚45'E.), the W entrance point of Langesundsfjorden, about 26 miles NE, is exposed to the open sea. The coast is indented by two rather extensive inlets which trend through a hilly but generally level terrain. The inlets, though encumbered by numerous off-lying islands and many awash and submerged dangers, are fairly deep throughout.

Jomfruland (58˚51'N., 9˚36'E.), about midway along the coast, is the farthest seaward of the off-lying larger islands and is distinctive as the only large, low-lying and comparatively flat island, between Risor and Langesundsfjorden. The lighthouse and the radio mast, marked with red and white obstruction lights, are conspicuous from sea.

2.17 **Portor** (58˚48'N., 9˚26'E.) lies in the SW approach to Kragero. The community fronts on a small, sheltered harbor surrounded by a number of islets and awash and submerged rocks. It is reached by a number of winding, narrow channels available to small vessels with local knowledge, and then only during favorable weather conditions.

Stolefjorden, immediately N of Portor, may be reached by steering to pass NE of the beacon situated on **Stangskjaer** (58˚49'N., 9˚29'E.). From the vicinity of Stangskjaer steer N and then WSW to pass N and W of Fengsholmen, Bekkevikskjaer, and Tviskjaer, which lie, respectively, 0.45 mile W, 1 mile WSW, and about 1 mile WSW of Stangskjaer beacon.

When the vessel is NW of Tviskjaer, a SSW heading will lead E of the 5m below-water rock about 0.5 mile WSW of Tviskjaer and toward the E approach to Gamle Portor.

Small vessels with local knowledge may anchor at Gamle Portor in depths up to 35m, clay.

Submarine cables are laid across the fjord near **Haslumkilen** (58˚48'N., 9˚23'E.).

Gamle Portor anchorage is protected by a line of islets extending ENE from **Kjeholmen** (58˚48'N., 9˚24'E.). Care must be taken to avoid the 7m patch lying in the narrow E entrance. An overhead cable, with a vertical clearance of 25m, spans Stolefjorden, close W of Kjeholmen.

Stanggapet, the SSE approach to Kragero, is an all weather passage and the most commonly used from sea. This passage leads into Kragerofjorden and then on to Kragero.

Currents set strongly through Kragerofjorden, generally under the influence of the wind, though at times they may run against the wind. The seaward flow is the stronger and more frequent and usually reaches its greatest velocity off the mainland point Stromtangen.

Kragero (58˚52'N., 9˚25'E.)

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2.18 Kragero is a small town with a good sheltered harbor; it serves as a trans-shipment center for neighboring quartz and feldspar quarries.

Ice.—Ice forms over most of the inner waters in the approach to Kragero, and during severe winters may close various anchorages from January to April, as well as bringing shipping to a standstill for as long as two months. The harbor itself, however, is seldom hindered by ice.

Tides—Currents.—Tidal action is negligible. Offshore currents act under the influence of wind conditions and generally tend to set landward. Inshore currents generally set seaward out of Kilsfjorden and through Kragerofjorden.

The current N of Tatoy is strong and commonly sets E, while S of that island it is much weaker and may set W under the influence of the wind.

Water level is similarly influenced more by winds than tidal conditions in that it rises with W winds and falls with E winds.

The highest observed water level reached during storm conditions was 1.4m.

Depths—Limitations.—The least depth in the approach to the main facilities is 12.5m. The longest berth is situated at Stillnestangen, at the N end of the harbor. It is 129m long and has depths of 3.7 to 10m alongside.

The deepest berth is at Jernbanekaien, 0.4 mile SSW of Stillnestangen. It is 100m long and has depths of 6.7 to 11.6m alongside. Steamboat Quay provides a ro-ro berth. It is 91m long and has a depth of 7.2m alongside. There are also several berths for small coasters and fishing vessels.

Vessels up to 8.4m draft can be accommodated in the harbor. A vessel of 26,000 dwt, in ballast, has been handled.

Pilotage.—Pilotage is compulsory for vessels over 50 grt and is available day and night. Pilots are provided by the station at Brevik (59˚03'N., 9˚42'E.) and board at 58˚56.6'N., 9˚47.7'E.

Anchorage.—Kjerkebukta (58˚52'N., 9˚24'E.), the water area N of Tatoy and between the islets Kjerkeholmen and Store Furuholmen, has anchorage in 29 to 50m, good holding ground of stone and clay. An overhead cable, with a vertical clearance of 22m, spans the E end of the channel between Kjerkeholmen and the N side of Tatoy.

Havnefjorden, the water basin between Kragero and the off-lying islet Oya, has excellent sheltered anchorage for small vessels in about 20m, good holding ground of stone and clay, in a position clear of foul ground extending from Oya.

Vessels commonly moor and make their stern fast to the Kragero side of the basin.

The area between Oya and the mainland point Stilnestangen has anchorage in 16 to 29m, good holding ground.

Hellefjorden (58˚53'N., 9˚23'E.), a deepwater, often icebound inlet N of Kragero, has anchorage and alongside berthing facilities off the community Helle. Vessels make their approach through the narrow, winding passage leading close aboard Lovisenberg, a village on the SW side of the entrance to the inlet.

2.19 **Kilsfjorden** (58˚51'N., 9˚21'E.), the W continuation of Kragerofjorden, is best entered S of the island Tatoy. The

KRAGERO FROM SW

river Kammerfosselva enters Kilsfjorden about 1 mile NW of Tatoy and causes the current to set S, particularly during periods of river flood, and the current may carry to the S shore.

The flow generally sets out of the fjord but wind conditions can cause a shift in direction. The rate is often very strong in the main approach channel from the SSE.

To the N of **Tatoy** (58˚59'N., 9˚24'E.) in Kilsfjorden, a strong E flow is experienced by the runoffs; however, to the S of Tatoy the E flow is much weaker.

Close W of the river, the Atangen range lights are shown in line bearing 329˚. These lights are located 1.25 miles NW of the Tatoy Light-structure.

Eidskilen (58˚50'N., 9˚19'E.), the E arm of an inlet on the S side of Kilsfjorden, has excellent anchorage for small vessels in about 8m in a position near its head. Vessels make their approach N and W of a 5m, below-water rock lying off the E entrance point of the inlet; then proceed in mid-channel.

Kjolebrunnkilen (58˚50'N., 9˚17'E.), a narrow inlet in the SW part of Kilsfjorden, has anchorage for small vessels in 20m, good holding ground, in a position near its head. Vessels pass SE of an awash rock in the entrance to the inlet and then proceed in mid-channel.

Kil (58˚52'N., 9˚19'E.), a compact community at the head of the elongated NW part of Kilsfjorden, fronts on a water area close S which has anchorage for moderate-sized vessels in 12 to 15m, good holding ground of mud. A concrete quay on the E shore is 28m in length and has depths from 4 to 6m.

2.20 **Skatoy** (58˚51'N., 9˚30'E.) has several anchorages along its S side for vessels with local knowledge.

Vessels bound for these anchorages from the sea steer for **Vestre Naus** (58˚50'N., 9˚31'E.) on a heading of 348˚ until close under that rock, when they steer NE to pass between Vestre Naus and the submerged dangers of Jonsgrunn, about 183m to the E. Then with caution they proceed to one of the following anchorages.

Korset (58˚50'N., 9˚31'E.), a village in the SE part of Skatoy, fronts on a deepwater but quite restricted natural harbor which has sheltered anchorage for small vessels in 17m in a position between the village and an off-lying islet.

Ostre Donnevika (58˚51'N., 9˚31'E.), the easternmost of the three inlets indenting the S side of Skatoy, has anchorage in 14m depth in a position N of the Langholmen islet with the W extremity of the islets in range on or about 206˚ in line with Stangskjaer cairn. Vessels approach with the NW extremity of Vestre Rauane in range, astern, with the S side of Stangskjaer.

Vestre Donnevika (58˚51'N., 9˚30'E.), the middle inlet, has anchorage for small vessels in about 8.m, good holding ground, in a position with the E extremity of Vestre Rauane bearing about 174˚ and just obscured by Donnevikpynten, the E extremity of the islet in the entrance to the inlet.

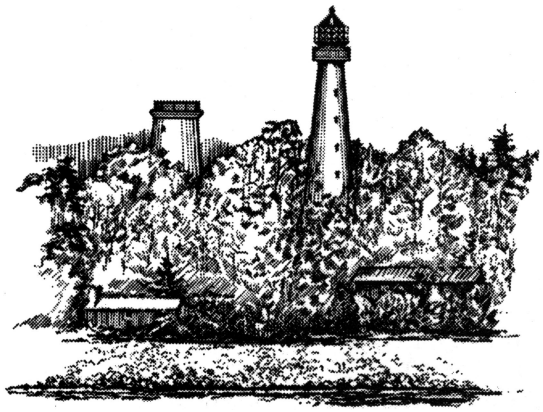
Vessels, making their approach E of the islet Aeroy, steer for the light-colored E entrance point of the inlet open W of the dark-colored W entrance point and proceed so as to pass W of the awash rock midway between Aeroy and Langholmen and then E of a 2m below-water rock NE of Aeroy, where they steer for the anchorage.

Asvika (58˚51'N., 9˚29'E.), the W inlet, has anchorage for large vessels in 19m in a position S of its entrance. In the middle of the cove, anchorage is available in a depth of 10m; mooring rings are available. Vessels, making their approach W of Aeroy, steer for the islet close SW of Aeroy in range with Skarveset (an awash rock NW of Ternholmen) and proceed so as to pass through the very narrow channel between Ternholmen (to port) and the awash and submerged dangers off-lying Skatoy (to starboard).

When clear of Ternholmen, they pass 60 to 70m W of Skarveset and then continue NW to the anchorage.

2.21 Jomfrulandsrenna's S part, an unsheltered inner passage, leads NE between the mainland and an off-lying elongated shoal reef extending SW from Jomfruland.

The axis of its fairway is centered along a line with Djupodden light in range with **Jomfruland Light** (58˚51.8'N., 9˚36.1'E.) bearing 046˚; it continues inshore of the island.



JOMFRULAND LIGHTHOUSE (58˚51.8'N., 9˚36.1'E.)

The SW approach to Jomfrulandsrenna is from Rodskjaergapet and, though it is well-marked and has a least depth of 6m, it is only suitable for vessels with local knowledge.

Currents in Jomfrulandsrenna are usually NE going in W winds and the opposite direction during E winds, but it may set against the wind. The SW flow is stronger and may attain a rate of 3 knots, especially when strong E winds begin suddenly.

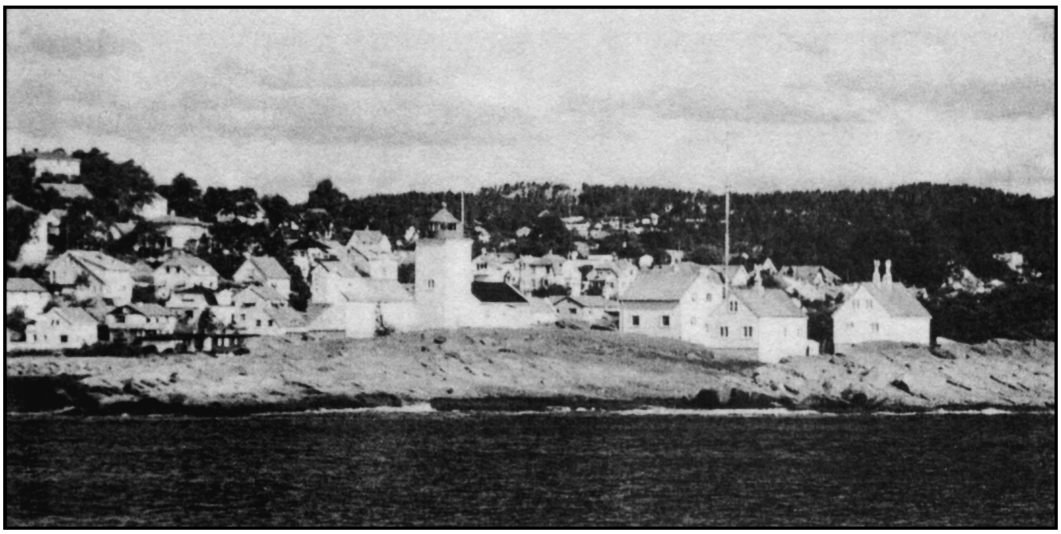
Lokstadbukta (58˚51'N., 9˚34'E.), 0.75 mile SW of Djupodden light, has good anchorage in 10 to 20m. A small wooden quay at Djupodden has a depth of 5m alongside.

Bratoybukta, a narrow encumbered inlet on the E side of Skatoy, 1 mile WNW of Lokstadbukta, has anchorage for small vessels in 19m, good holding ground, in a position near the entrance; farther in, the bottom becomes rocky.

2.22 The N part of Jomfrulandsrenna continues NE along the NW side of Jomfruland. It leads E of Ellevbaen (58˚52'N., 9˚35'E.), situated 0.75 mile SW of Jomfruland Light, W of Hagenbaen, E of Dambaen, and W of the awash rocks at Beverskjaera, which lie 0.45 mile N of the light.

Mefjordskjaer, an awash rock marked by a beacon, situated 0.8 mile NNW of Jomfruland light, is on the port hand and Eikeskogbaen 0.25 mile ENE is left to starboard.

A rocky patch with a least depth of 6m, 0.5 mile NNE of Eikeskogbaen, is passed to port; the passage continues on to the NNE.



LANGOYTANGEN LIGHTHOUSE FROM E

Hovedgard (58˚52'N., 9˚36'E.), close N of Jomfruland Light, has anchorage in about 24m, good holding ground; a submarine cable lies across the channel close S of the anchorage.

Sandbakken (58˚53'N., 9˚36'E.), a bight on the E side of the fairway 0.5 mile SSW of the N extremity of Jomfruland, has anchorage in 15 to 19m, sand and stone.

Skatoysundet (58˚52'N., 9˚34'E.), a winding dangerous passage, available only to small vessels with good local knowledge, leaves Jomfrulandsrenna in the vicinity of Mefjordskjaer and leads to Kragero by passing S of Oteroy and N of Skatoy.

2.23 From Kragero to **Langesundstagen** (Langoytangen) (58˚59'N., 9˚45'E.), about 12 miles NE, the offshore area comprises a heavy concentration of larger islands sheltering Kragero out to Jomfruland, and a scattering of lesser islands extending NE in a series of parallel rows.

The number of islands decreases then cease altogether beyond Store Sastein, a reef fringed island 1.75 miles SW.

Langoytangen Lighthouse (58˚59.4'N., 9˚45.7'E.) is shown on the coast and reported as a good landmark.

Steingrunnen, an extensive shoal area, lies at the outer limit of the islets and rocks extending NE from Jomfruland, and constitutes the principal submerged danger farthest to sea along this coast; it lies 2.5 miles S of Store Sastein.

Several winding, and in places narrow, channels lead from the sea through these islands and submerged dangers to Kragero, as well as to a number of anchorages and small ore loading places. These passages are available using local knowledge.

Ice occurs in much of these inner waters from January to March, or in exceptional cases, to the end of April, and closes most anchorages E of Jomfruland.

The NE, or Langarsund approach, to Kragero leads in from sea N of **Ranhausen** (58˚56'N., 9˚44'E.), a rock with a depth of 4.5m in the N part of Steingrunnen, then continues to pass through Eksefjorden, Langarsund, and Kjopmannsfjorden, then N of Baeroy to Kragero.

An overhead cable with a vertical clearance of 35m spans Langarsund at the SW end of Sundgardsholmen.

Fossingfjorden is a mainland inlet extending Eksefjorden to the NW.

The SW side of the fjord is an administrative adjunct to Kragero. It is deep and clear of dangers and trends inland through comparatively high terrain rising steeply from the waters edge. Current is negligible, except near the head of the inlet.

Barmskilen (58˚56'N., 9˚29'E.), an inlet on the SW side of Fossingfjorden, has a little used anchorage in 19m, clear of a 4m below-water rock off-lying its SE side.

Fossing (58˚56'N., 9˚28'E.), a village at the head of Fossingfjorden, has deep water alongside berthing facilities fronting a sawmill and good anchorage in about 19m, in a position opposite the sawmill and close off the village of Vaerven. A concrete quay at Fossing is 60m in length with depths of 11 to 21m alongside.

Vagoyfjorden (58˚56'N., 9˚34'E.) is entered from Eksefjorden. There is anchorage in the fjord for large vessels in a depth of 20m, clay bottom, lying about midway between the two islands of Vagoy and the mainland.

Small vessels can anchor in Prestvika, a cove at the head of Vagoyfjorden, in depths up to 15m, mud; mooring rings are available.

2.24 Jomfrulandsgapet, Harenna, and Feierrenna are a scattering of awash and submerged dangers extending NE from Jomfruland. Jomfruland is crossed from sea by two passages, available during fair weather to small vessels with local knowledge.

Jomfrulandsgapet leads in between the forested N extremity of Jomfruland and the flat low-lying island of **Straholmen** (58˚45'N., 9˚39'E.), situated about 1 mile NE.

Mostein, close SE of Straholmen, is of a conical shape and of whitish color. It is conspicuous from sea.

HAFSUNDET, TROSBYFJORDEN, AND VAGOYFJORDEN FROM SE

JOMFRULAND FROM E

The passage itself is shallow and in bad weather the sea breaks.

Harenna and Feierrenna, lead, respectively, SW and NE of the rocky patch **Skjaerbaane** (58˚55'N., 9˚42'E.). They join between the foul ground extending NE from Straholmen and the reef fringed low-lying islet Straholmsteinen, which is marked by a beacon.

Tonerleia is a partially sheltered, narrow deep water inner passage which joins Eksefjorden and Langarsund with Langarsundfjorden; the channel is only suitable for small vessels with local knowledge.

From Eksefjorden, vessels pass close SE of **Vittenskjull** (58˚56'N., 9˚37'E.) and SE of Stangholmen, an islet 0.4 mile NE, then between two chains of awash and submerged rocks which extend 0.2 mile SSW from Danholmen, and SSW of Langholmen.

Vessels then transit Bjornoyrenna, a narrows NW of Bjornoy, and continue NE to pass in mid-channel between Store Eggelos and Lille Eggelos then SE of Stutene.

Mejulen (58˚58'N., 9˚42'E.), an islet, has a wide marble stripe running from the summit to the W and down to the sea.

Mejulen Light (58˚57'N., 9˚41.4'E.) is shown on the NW side of the islet.

Sasteinsundet, the narrow channel between the mainland and the off-lying Mejulen and Store Sastein, is foul on both sides so that a mid-channel course should be steered until clear of Store Sastein.

2.25 Havsundhamn (58˚56'N., 9˚37'E.), a small harbor entered from the S part of Tonerleia, lies in the narrow S entrance to Trosbyfjorden. It has good anchorage for small vessels with local knowledge in 14m, sand. Small craft can proceed to Trosby, a village with a good quay at the head of the fjord, 1 mile N of the entrance. Numerous overhead cables, with vertical clearances from 6 to 17m, span the entrance to the fjord.

Tonerhamn, formed between Danholmen and Toneroy, 0.15 mile N, provides anchorage for vessels in 16m, clay and mud.

The bottom becomes rocky in the N part of the anchorage.

An overhead cable, with a vertical clearance of 15m, extends SSW from Toneroy to a small islet.

2.26 Bjornoybukta (58˚58'N., 9˚39'E.), a small encumbered inlet, occasionally used for the transshipment of feldspar, is approached E of the awash rock Kalven, situated 0.65 mile SW of Mejulen.

From Kalven, the track leads NW by steering for the E extremity of Haraldoy in range with E extremity of a smaller island farther within the inlet.

Proceed to pass between the reef fringed awash rock Alskjaer, to port, and the dangers NE, to starboard. Then steer close to the mainland point Braknestangen and pass E of Haraldoy to the anchorage.

The sheltered anchorage for small vessels is 183m N of Haraldoy, in 9m, sand and mud.

Two inlets indent the mainland coast between the NE entrance to Tonerleia and Langesundstangen.

Abyfjorden (58˚59'N., 9˚42'E.), entered between Stangodden and a point about 0.3 mile NNE, is encumbered with islets and rocks.

Small vessels, with local knowledge, can anchor off the mouth of the river Abyelva, in the W part of the fjord, in a depth of 2 to 13m, mud and clay. Routes for approaching the anchorage are narrow and intricate.

Elvikbukta, a cove 0.25 mile WNW of Stangodden, in the S part of Abyfjorden, has an anchorage in 7m, mud, in a position close SW of a small islet in its entrance.

Rognsfjorden (59˚00'N., 9˚43'E.), entered NW of Langesundstangen, has a margin of foul ground on its W side; the N part of the inlet is divided into two arms.

Hesteklovbaen, which lies 0.45 mile WNW of Langesundstangen, has a depth of 6.8m.

Near the middle of the fjord are several dangers, whose positions may best be seen on the chart.

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